## SEQUENCE LISTING

<110> Vector Tobacco, Ltd.

<120> GLOBAL GENE EXPRESSION ANALYSIS OF HUMAN BRONCHIAL EPITHELIAL CELLS EXPOSED TO CIGARETTE SMOKE, SMOKE CONDENSATES, OR COMPONENTS THEREOF <130> VTOB.302VPC <140> Unknown <141> 2005-03-29 <150> 60/557,929 <151> 2004-03-30 <160> 5 <170> FastSEQ for Windows Version 4.0 <210>1 <211> 5688 <212> DNA <213> Artificial Sequence <220> <223> Full-length QTPase RNAi construct <400> 1 ctcgaggatc taaattgtga gttcaatctc ttccctattg gattgattat cctttctttt 60 cttccaattt gtgtttcttt ttgcctaatt tattgtgtta tcccctttat cctattttgt 120 ttctttactt atttatttgc ttctatgtct ttgtacaaag atttaaactc tatggcacat 180 attttaaagt tgttagaaaa taaattcttt caagattgat gaaagaactt tttaattgta 240 gatatttcgt agattttatt ctcttactac caatataacg cttgaattga cgaaaatttg 300 tgtccaaata tctagcaaaa aggtatccaa tgaaaatata tcatatgtga tcttcaaatc 360 tigtgtctta tgcaagattg atactttgtt caatggaaga gattgtgtgc atatttttaa 420 aatttttatt agtaataaag attctatata gctgttatag agggataatt ttacaaagaa 480 cactataaat atgattgttg ttgttagggt gtcaatggtt cggttcgact ggttatttta 540 taaaatttgt accataccat ttttttcgat attctatttt gtataaccaa aattagactt 600 ttogaaatog toocaatoat gtoggtttoa ottoggtato ggtacogtto ggttaatttt 660 cattttttt taaatgtcat taaaattcac tagtaaaaat agaatgcaat aacatacgtt 720 cttttatagg acttagcaaa agctctctag acatttttac tgtttaaagg ataatgaatt 780 aaaaaacatg aaagatggct agagtataga tacacaacta ttcgacagca acgtaaaaga 840 aaccaagtaa aagcaaagaa aatataaatc acacgagtgg aaagatatta accaagttgg 900 gattcaagaa taaagtctat attaaatatt caaaaagata aatttaaata atatqaaagg 960 aaacatatte aatacattgt agtttgetae teataatege tagaataett tgtgeettge 1020 taataaagat acttgaaata gcttagttta aatataaata gcataataga tittaggaat 1080 tagtattttg agtttaatta cttattgact tgtaacagtt tttataattc caaggcccat 1140 gaaaaattta atgctttatt agttttaaac ttactatata aatttttcat atgtaaaatt 1200 taatcggtat agttcgatat tttttcaatt tatttttata aaataaaaaa cttaccctaa 1260 ttatcggtac agttatagat ttatataaaa atctacggtt cttcagaaga aacctaaaaa 1320 teggtteggt geggaeggtt egateggttt agtegatttt caaatattea ttgacactec 1380

tagttgttgt tataggtaaa aagcagttac agagaggtaa aatataactt aaaaaatcag 1440 ttctaaggaa aaattgactt ttatagtaaa tgactgttat ataaggatgt tgttacagag 1500

aggtatgagt gtagttggta aattatgttc ttgacggtgt atgtcacata ttatttatta 1560 aaactagaaa aaacagcgtc aaaactagca aaaatccaac ggacaaaaaa atcggctgaa 1620 tttgatttgg ttccaacatt taaaaaagtt tcagtgagaa agaatcggtg actgttgatg 1680 atataaacaa agggcacatt ggtcaataac cataaaaaat tatatgacag ctacagttgg 1740 tagcatgtgc tcagctattg aacaaatcta aagaaggtac atctgtaacc ggaacaccac 1800 ttaaatgact aaattaccct catcagaaag cagatggagt gctacaaata acacactatt 1860 caacaaccat aaataaaacg tgttcagcta ctaaaacaaa tataaataaa tctatgtttg 1920 taagcactcc agccatgtta atggagtgct attgcctgtt aactctcact tataaaatag 1980 taqtaqaaaa aatatqaacc aaaacacaac aacatctcaa aatatttgaa qtaacacaga 2040 attttacata caccaaactt ataaatcaag tattttcatt gtaacaaatt ccatgaaaca 2100 tgaaaacaaa gctataatga aattaccaac tcaagcaata aggttggaaa agagccatct 2160 gagatattcc agcaatttac atcttttgt ttgattacac agtgaaggat cttttgtttg 2220 acaactagta aaatgattet tatttgeace ttteagetat teagetgett ttaeteeaae 2280 cctatagcag aagtaatggc gctcatgctc gttttgtacg ccttccaact tcaagggcga 2340 gctctgtatc gatcttcagg gaaatgtcaa gtgctttcac ggaatgcgtc agggcaccac 2400 tagaaatgta ggtaacacca gtttgtccaa tcttgtgtac tgtttcaagg gtaacatttc 2460 ctgaagcctc cgtatcaaac ctcccattga tcaattctac agcctcctta agcatggata 2520 catcaatatc tccgttagat aatggaacaa ccatattgtc cagcattatc ctagtcaacg 2580 aagtetttgt ttgagatgea tagtetagaa eeteaegtae ttetteaatt gteetggttt 2640 caacctcaac ccctatttga agtttatttt gctccaaata ctgatccaca gattttagag 2700 ctttgccgac acctccagca gcagatatgt gattgtcttt tatcattacc atatcaaata 2760 agcccattct gtgattcttc cccccaccga tcaataccgc ccatttatcc accaaacgta 2820 atccaggage agttttccta gtctccaaga tgtaagcagg gtgtgcagca tctgccattt 2880 ccttagttag tgtagctatt ccactcattc tttgcataaa attgagaaca accctctcag 2940 ctataacaat gttgtaagcg tttccttgta ctttgccaaa tttcaagcct ttatgaactt 3000 tategecate attracatae cactecacet ttaatgaagg atcaacttee gegaatatea 3060 totcagcaag tgcaattcct gctatgatcc cgtcttcctt tgctagaaaa tgagcatcgg 3120 attccatate aagaggaatt gtegeettac aagtcacate teetaaatte ceagcatett 3180 caqaqaqtqc aagtttcata acttccttta aatcataagt tgggtgtgct ggtggtttca 3240 cctctaatqa ctccactctt qtattcttqq tqqctattqc tgacattttc accaccaacc 3300 ttqqaqctqt aattqcataa qqatqcactq tagcaqtgaa aggaatagct ctaaacatgg 3360 ttttttttttq qqqqqqttqt gaaatgaatt ttgtqqaaaa tagtttttgg ggcacatcaa 3420 tcctgcggtg acattcggaa tgtttctaac aagaaagata tcgttggtcc gagccttgct 3480 ctacatcata geteagtgea taggggeeet gtgegggtge geettagtea agacattgea 3540 gcgagatcat tacaaccact atggcggtgg cgctaaccag ctcgttgatg gttatagccg 3600 aggeactgge cttgetgttg agattatggg cacetttatt cttetgtata ctgtettete 3660 cgccactgat cccaaacgca atgctagaga ttcccatgtt cctgtcttgg ctccactccc 3720 cattggcttt gctgtcttca ttgttcacct cgccaccatt cccgtcaccg gcactggcat 3780 accatgttta gagctattcc tttcactgct acagtgcatc cttatgcaat tacagctcca 3900 aggttggtgg tgaaaatgtc agcaatagcc accaagaata caagagtgga gtcattagag 3960 gtgaaaccac cagcacaccc aacttatgat ttaaaggaag ttatgaaact tgcactctct 4020 gaagatgctg ggaatttagg agatgtgact tgtaaggcga caattcctct tgatatggaa 4080 tccgatgctc attttctagc aaaggaagac gggatcatag caggaattgc acttgctgag 4140 atgatattcg cggaagttga tccttcatta aaggtggagt ggtatgtaaa tgatggcgat 4200 aaagttcata aaggcttgaa atttggcaaa gtacaaggaa acgcttacaa cattgttata 4260 gctgagaggg ttgttctcaa ttttatgcaa agaatgagtg gaatagctac actaactaag 4320 gaaatggcag atgctgcaca ccctgcttac atcttggaga ctaggaaaac tgctcctgga 4380 ttacgtttgg tggataaatg ggcggtattg atcggtgggg ggaagaatca cagaatgggc 4440 ttatttgata tggtaatgat aaaagacaat cacatatctg ctgctggagg tgtcggcaaa 4500 gctctaaaat ctgtggatca gtatttggag caaaataaac ttcaaatagg ggttgaggtt 4560 gaaaccagga caattgaaga agtacgtgag gttctagact atgcatctca aacaaagact 4620 tcgttgacta ggataatgct ggacaatatg gttgttccat tatctaacgg agatattgat 4680 gtatccatgc ttaaggaggc tgtagaattg atcaatggga ggtttgatac ggaggcttca 4740 ggaaatgtta cccttgaaac agtacacaag attggacaaa ctggtgttac ctacatttct 4800 agtggtgccc tgacgcattc cgtgaaagca cttgacattt ccctgaagat cgatacagag 4860 ctcqcccttq aagttggaag gcgtacaaaa cgagcatgag cgccattact tctgctatag 4920

```
qqttqqaqta aaaqcaqctg aatagctgaa aggtqcaaat aaqaatcatt ttactagttq 4980
tcaaacaaaa qatccttcac tgtgtaatca aacaaaaaga tgtaaattgc tggaatatct 5040
cagatggctc ttttccaacc ttattgcttg agttggtaat ttcattatag ctttgttttc 5100
atgtttcatg qaatttgtta caatgaaaat acttgattta taagtttggt gtatgtaaaa 5160
ttctgtgtta cttcaaatat tttgagatgt tgagctcgtg aaatggcctc tttagttttt 5220
gattgaatca taggggtatt agttttctat ggccgggagt ggtcttcttg cttaattgta 5280
atggaataac cagagaggaa ctactgtgtt atctttgagg aatgttgggc ttttttcgtt 5340
tgaattatca tgaatgaaat tttacttttt cccaatacaa gtttgttttc gtttcttggt 5400
ttttgttatc ccttggttta tgtcttggtt tggcttaaat gattgaagat tacactacct 5460
atqtttctqc tattcctqtt qaaqatcaca tttqataata atqcatcqaa tqcattaaaq 5520
tttcttattg gctctgtcaa aagtattgaa ggtggatttt tctaattggc aagagaaagt 5580
attaaagagg tgatttatta gtacttatat titteteage atetetetit eagtgttgga 5640
gcttcataaa attagcactt cagagtttca gtcgggagct gaattcga
<210> 2
<211> 3600
<212> DNA
<213> Artificial Sequence
<220>
<223> Selection cassette for full-length QTPase RNAi
      construct
<400> 2
tctagaatgt tcgtgcgtca aatggataaa caaaaaaata gcataagtta gttttgttac 60
tcqaqaqtta tqtattataa qqtataqqqa aatqactcaa acataccact qaacttaacq 120
aaacqacqca tatatatact acttaactta acqaaaaaqq qqtqaqaqtq qatqqqtqct 180
qqtaaataat qaaqqgttta tataacgtca cgtgtcaaaa ttcgatagta gtagtttcgt 240
tagttqtaat aqcatatatq qcccaaaqtt ataatataqa taatatqttt atqtccaact 300
attaacqaqt qacataqaca qttcattttq tqaaqttcaa tqacatattt qaqccctttc 360
ccttttatta tctcctttta tttgttctaa taaaagaatg gcatttatta tgtacataga 420
caaataacta ttttctttgg aatataattt gtttatatat tttaaaatca tgtctcaatt 480
tagtttgttt tgtgcatatt tcaactattc aattttgtcc atatatttat taccttcccc 540
catttacaag cattgaaccg ctttgctcac caaaacttat gcacattgca aaaatatcat 600
gtaaaggttt tatgtatgct gtaattaagg tctgaactca tcgtgatttt atttttaggc 660
ttcattgacc actaccaaac tctttgatgc tacattttct aattatattg gagttcgatt 720
atateegaat tegegttgeg tagggeecat tegagggaaa acaeteecta teaaggattt 780
tttcataccc agagetcgaa etcaagacat etggttaagg gaagaacagt etcatecact 840
gcaccatatc cttttgtggt caacaagtaa attttatgta gaaccaaaaa ctatactcga 900
attgataaaa taaatggtgt aaaatattgt tttctttctt acattttgga cagtaaatat 960
gtaggacaat aataattagc gtggggtctt aagaaaatta gcatagattt ccagaaattc 1020
caaatcaacc ggcagttcca ggtttgaaaa ctacaactca ttccgacggt tcaaacttca 1080
aaccatgctt gctgactcgg cttcttcttt ctttttcacc aagacagagc agtagtcacg 1140
tgacacccct cacgtgcctc ccccctttat atttcagact gcaaccctac actttcgcta 1200
cattcactac catattett teactaagea attttetet etactttet ttaaacceet 1260
tttttctccc ctaagccatg gcatctagat catgttacgt cctgtagaaa ccccaacccg 1320
tgaaatcaaa aaactcgacg gcctgtgggc attcagtctg gatcgcgaaa actgtggaat 1380
tgatcagcgt tggtgggaaa gcgcgttaca agaaagccgg gcaattgctg tgccaggcag 1440
ttttaacgat cagttcgccg atgcagatat tcgtaattat gcgggcaacg tctggtatca 1500
gcgcgaagtc tttataccga aaggttgggc aggccagcgt atcgtgctgc gtttcgatgc 1560
ggtcactcat tacggcaaag tgtgggtcaa taatcaggaa gtgatggagc atcagggcgg 1620
ctatacgcca tttgaagccg atgtcacgcc gtatgttatt gccgggaaaa gtgtacgtat 1680
caccgtttgt gtgaacaacg aactgaactg gcagactatc ccgccgggaa tggtgattac 1740
cgacgaaaac ggcaagaaaa agcagtctta cttccatgat ttctttaact atgccggaat 1800
ccategeage gtaatgetet acaceaegee gaacacetgg gtggaegata teacegtggt 1860
gacgcatgtc gcgcaagact gtaaccacgc gtctgttgac tggcaggtgg tggccaatgg 1920
tgatgtcagc gttgaactgc gtgatgcgga tcaacaggtg gttgcaactg gacaaggcac 1980
```

tagogggact ttgcaagtgg tgaatoogca cototggcaa cogggtgaag gttatotota 2040

```
tgaactgtgc gtcacagcca aaagccagac agagtgtgat atctacccgc ttcgcgtcgg 2100
catceggtca gtggcagtga agggcgaaca gttcctgatt aaccacaaac cgttctactt 2160
tactggcttt ggtcgtcatg aagatgcgga cttgcgtggc aaaggattcg ataacgtgct 2220
gatggtgcac gaccacgcat taatggactg gattggggcc aactcctacc gtacctcgca 2280
ttacccttac gctgaagaga tgctcgactg ggcagatgaa catggcatcg tggtgattga 2340
tgaaactgct gctgtcggct ttaacctctc tttaggcatt ggtttcgaag cgggcaacaa 2400
gccgaaagaa ctgtacagcg aagaggcagt caacggggaa actcagcaag cgcacttaca 2460
ggcgattaaa gagctgatag cgcgtgacaa aaaccaccca agcgtggtga tgtggagtat 2520
tgccaacgaa ccggataccc gtccgcaagg tgcacgggaa tatttcgcgc cactgqcgga 2580
agcaacgcgt aaactcgacc cgacgcgtcc gatcacctgc gtcaatgtaa tgttctgcga 2640
cgctcacacc gataccatca gcgatctctt tgatgtqctg tgcctgaacc qttattacqg 2700
atggtatgtc caaagcggcg atttggaaac ggcagagaag gtactggaaa aagaacttct 2760
ggcctggcag gagaaactgc atcagccgat tatcatcacc gaatacggcg tggatacgtt 2820
agccgggctg cactcaatgt acaccgacat gtggagtgaa gagtatcagt gtgcatggct 2880
ggatatgtat caccgcgtct ttgatcgcgt cagcgccgtc gtcggtgaac aggtatggaa 2940
tttcgccgat tttgcgacct cgcaaggcat attgcgcgtt ggcggtaaca agaaagggat 3000
cttcactcgc gaccgcaaac cgaagtcggc ggcttttctg ctgcaaaaac gctggactgg 3060
catgaacttc ggtgaaaaac cgcagcaggg aggcaaacaa tgagagctcg tgaaatggcc 3120
tetttagttt ttgattgaat cataggggta ttagttttet atggeeggga gtggtettet 3180
tgcttaattg taatggaata accagagagg aactactgtg ttatctttga ggaatqttgg 3240
gcttttttcg tttgaattat catgaatgaa attttacttt ttcccaatac aagtttqttt 3300
tegtttettg gtttttgtta teeettggtt tatgtettgg tttggettaa atgattgaag 3360
attacactac ctatgtttct gctattcctg ttgaagatca catttgataa taatgcatcq 3420
aatgcattaa agtticttat tggctctgtc aaaagtattg aaggtggatt tttctaattg 3480
gcaagagaaa gtattaaaga ggtgatttat tagtacttat attittetea gcatetetet 3540
ttcagtgttg gagcttcata aaattagcac ttcagagttt cagtcgggag ctgaattcga 3600
<210> 3
<211> 4134
<212> DNA
<213> Artificial Sequence
<220>
<223> Partial QTPase RNAi construct
<400> 3
ctegaggate taaattgtga gtteaatete tteeetattg gattgattat eetttettt 60
cttccaattt gtgtttcttt ttgcctaatt tattgtgtta tcccctttat cctattttqt 120
ttetttaett atttatttge ttetatgtet ttgtacaaag atttaaacte tatgqcacat 180
attttaaagt tgttagaaaa taaattcttt caagattgat gaaagaactt tttaattgta 240
gatatttcgt agattttatt ctcttactac caatataacg cttgaattga cgaaaatttq 300
tgtccaaata tctagcaaaa aggtatccaa tgaaaatata tcatatgtga tcttcaaatc 360
ttgtgtctta tgcaagattg atactttgtt caatggaaga gattgtgtgc atatttttaa 420
aatttttatt agtaataaag attctatata gctgttatag agggataatt ttacaaagaa 480
cactataaat atgattgttg ttgttagggt gtcaatggtt cggttcgact ggttatttta 540
taaaatttgt accataccat ttttttcgat attctatttt gtataaccaa aattagactt 600
ttegaaateg teecaateat gteggtttea etteggtate ggtaeegtte ggttaatttt 660
cattttttt taaatgtcat taaaattcac tagtaaaaat agaatgcaat aacatacgtt 720
cttttatagg acttagcaaa agctctctag acatttttac tgtttaaagg ataatgaatt 780
aaaaaacatg aaagatggct agagtataga tacacaacta ttcgacagca acgtaaaaga 840
aaccaagtaa aagcaaagaa aatataaatc acacgagtgg aaagatatta accaagttgg 900
gattcaagaa taaagtctat attaaatatt caaaaagata aatttaaata atatgaaagg 960
aaacatattc aatacattgt agtttgctac tcataatcgc tagaatactt tgtgccttgc 1020
taataaagat acttgaaata gcttagttta aatataaata gcataataga ttttaggaat 1080
tagtattttg agtttaatta cttattgact tgtaacagtt tttataattc caaggcccat 1140
```

```
gaaaaattta atgctttatt agttttaaac ttactatata aatttttcat atgtaaaatt 1200
taatcggtat agttcgatat tttttcaatt tatttttata aaataaaaaa cttaccctaa 1260
ttatcggtac agttatagat ttatataaaa atctacggtt cttcagaaga aacctaaaaa 1320
teggtteggt geggaeggtt egateggttt agtegatttt caaatattea ttgacaetee 1380
tagttgttgt tataggtaaa aagcagttac agagaggtaa aatataactt aaaaaatcag 1440
ttctaaggaa aaattgactt ttatagtaaa tgactgttat ataaggatgt tgttacagag 1500
aggtatgagt gtagttggta aattatgttc ttgacggtgt atgtcacata ttatttatta 1560
aaactagaaa aaacagcgtc aaaactagca aaaatccaac ggacaaaaaa atcggctgaa 1620
tttgatttgg ttccaacatt taaaaaagtt tcagtgagaa agaatcggtg actgttgatg 1680
atataaacaa agggcacatt ggtcaataac cataaaaaat tatatgacag ctacagttgg 1740
tagcatgtgc tcagctattg aacaaatcta aagaaggtac atctgtaacc ggaacaccac 1800
ttaaatgact aaattaccct catcagaaag cagatggagt gctacaaata acacactatt 1860
caacaaccat aaataaaacg tgttcagcta ctaaaacaaa tataaataaa tctatqtttq 1920
taagcactcc agccatgtta atggagtgct attgcctgtt aactctcact tataaaataq 1980
tagtagaaaa aatatgaacc aaaacacaac tttatcgcca tcatttacat accactccac 2040
ctttaatgaa ggatcaactt ccgcgaatat catctcagca agtgcaattc ctqctatgat 2100
cccgtcttcc tttgctagaa aatgagcatc ggattccata tcaagaggaa ttgtcgcctt 2160
acaagtcaca tetectaaat teecageate tteagagagt geaagtttea taaetteett 2220
taaatcataa gttgggtgtg ctggtggttt cacctctaat gactccactc ttgtattctt 2280
ggtggctatt gctgacattt tcaccaccaa ccttggagct gtaattgcat aaggatgcac 2340
tgtagcagtg aaaggaatag ctctaaacat gtccgtcgct tctcttccat ttcttctcat 2400
tttcgatttt gattcttatt tctttccagt agctcctgct ctgtgaattt ctccgctcac 2460
gatagatetg ettataetee ttacatteaa eettagatet ggtetegatt etetgtttet 2520
ctgttttttt cttttggtcg agaatctgat gtttgtttat gttctgtcac cattaataat 2580
aatgaactct ctcattcata caatgattag tttctctcgt ctacaaaacg atatgttgca 2640
ttttcacttt tcttctttt ttctaagatg atttgctttg accaatttgt ttagatcttt 2700
attttatttt attttctggt gggttggtgg aaattgaaaa aaaaaaaaac agcataaatt 2760
gttatttgtt aatgtattca ttttttggct atttgttctg ggtaaaaatc tgcttctact 2820
attgaatctt tcctggattt tttactccta ttgggttttt atagtaaaaa tacataataa 2880
aaggaaaaca aaagttttat agattetett aaacceetta egataaaagt tggaatcaaa 2940
ataattcagg atcagatgct ctttgattga ttcagatgcg attacagttg catggcaaat 3000
tttctagatc cgtcgtcaca ttttattttc tgtttaaata tctaaatctg atatatgatg 3060
tcgacaaatt ctggtggctt atacatcact tcaactgttt tcttttggct ttgtttgtca 3120
acttggtttt caatacgatt tgtgatttcg atcgctgaat ttttaataca aqcaaactqa 3180
tgttaaccac aagcaagaga tgtgacctgc cttattaaca tcgtattact tactactaqt 3240
cgtattctca acgcaatcgt ttttgtattt ctcacattat gccgcttctc tactctttat 3300
tccttttggt ccacgcattt tctatttgtg gcaatccctt tcacaacctg atttcccact 3360
ttggatcatt tgtctgaaga ctctcttgaa tcgttaccac ttgtttcttg tgcatgctct 3420
gttttttaga attaatgata aaactattcc atagtcttga gttttcagct tgttgattct 3480
tttgcttttg gttttctgca gatgtttaga gctattcctt tcactgctac agtgcatcct 3540
tatgcaatta cagctccaaq qttqqtqqtq aaaatqtcaq caataqccac caaqaataca 3600
agagtggagt cattagaggt gaaaccacca qcacacccaa cttatgattt aaaggaagtt 3660
atgaaacttg cactetetga agatgetggg aatttaggaq atgtgacttg taaggegaca 3720
attectettg atatggaate egatgeteat titetageaa aggaagaegg gateatagea 3780
ggaattgcac ttgctgagat gatattcgcg gaagttgatc cttcattaaa ggtggagtgg 3840
tatgtaaatg atggcgataa agcaagtgtg ttgcctttgt gtggaaatga agaggtactt 3900
gegaggactt tgcgtttatc agtttatgtg tttgtatatc tatttgatcc agttattatg 3960
gattatatac gcttgaaact cattttaagc cattgttatt gaacgtttat caaatacttt 4020
attatgccaa gcaagtcaaa cacatgcttg ttgattgaaa tcaagctata gaaatctctt 4080
cttcacatac agcagtttag attcacaata caacaagcga aacgataaag tttc
```

```
<210> 4
<211> 3387
<212> DNA
<213> Artificial Sequence
```

<220>

<223> Selection cassette for partial length QTPase RNAi construct

<400> 4 cgttttgacg agttcggatg tagtagtagc cattatttaa tgtacatact aatcgtgaat 60 agtgaatatg atgaaacatt gtatcttatt gtataaatat ccataaacac atcatgaaag 120 acactttctt tcacggtctg aattaattat gatacaattc taatagaaaa cgaattaaat 180 tacgttgaat tgtatgaaat ctaattgaac aagccaacca cgacgacgac taacgttgcc 240 tggattgact cggtttaagt taaccactaa aaaaacggag ctgtcatgta acacgcggat 300 cgagcaggtc acagtcatga agccatcaaa gcaaaagaac taatccaagg gctgagatga 360 ttaattagtt taaaaattag ttaacacgag ggaaaaggct gtctgacagc caggtcacgt 420 tatctttacc tgtggtcgaa atgattcgtg tctgtcgatt ttaattattt ttttgaaagg 480 ccgaaaataa agttgtaaga gataaacccg cctatataaa ttcatatatt ttctctccgc 540 tttgaattqt ctcqttqtcc tcctcacttt catcqqccqt ttttgaatct ccqqcqactt 600 gacagagaag aacaaggaag aagactaaga gagaaagtaa gagataatcc aggagattca 660 ttctccgttt tgaatcttcc tcaatctcat cttcttccgc tctttctttc caaggtaata 720 ggaactttct ggatctactt tatttgctgg atctcgatct tgttttctca atttccttga 780 gatctggaat tcgtttaatt tggatctgtg aacctccact aaatcttttg gttttactag 840 aatcqatcta aqttgaccga tcagttagct cgattatagc taccagaatt tggcttgacc 900 ttgatggaga gatccatgtt catgttacct gggaaatgat ttgtatatgt gaattgaaat 960 ctgaactgtt gaagttagat tgaatctgaa cactgtcaat gttagattga atctgaacac 1020 tgtttaagtt agatgaagtt tgtgtataga ttcttcgaaa ctttaggatt tgtagtgtcg 1080 tacgttgaac agaaagctat ttctgattca atcagggttt atttgactgt attgaactct 1140 ttttgtgtgt ttgcagetca tatggttgtg tttgggaatg tttctgcgge gaatttgcct 1200 tatcaaaacg ggtttttgga ggcactttca tctggaggtt gtgaactaat gggacatagc 1260 tttagggttc ccacttctca agcgcttaag acaagaacaa ggaggaggag tactgctggt 1320 cctttgcagg tagtttgtgt ggatattcca aggccagagc tagagaacac tgtcaatttc 1380 ttggaagetg ctagtttate tgeateette egtagtgete etegteetge taageetttg 1440 aaagttgtaa ttgctggtgc tggattggct ggattgtcaa ctgcaaagta cctggctgat 1500 gcaggccaca aacctctgtt gcttgaagca agagatgttc ttggtggaaa gatagctgca 1560 tggaaggatg aagatgggga ctggtatgag actggtttac atattttctt cggtgcttat 1620 ccgaatgtgc agaatttatt tggagaactt gggatcaatg atcggttgca gtggaaggaa 1680 cactccatga tttttgctat gccaagtaaa cctggagaat ttagtagatt tgacttccca 1740 gatgtectac cagcaccett aaatggtatt tgggetattt tgeggaacaa cgagatgetg 1800 acatggccag agaaaataaa gtttgctatt ggacttttgc cagccatggt cggcggtcag 1860 gcttatgttg aggcccaaga tggtttatca gtcaaagaat ggatggaaaa gcagggagta 1920 cctgagcgcg tgaccgacga ggtgtttatt gccatgtcaa aggcgctaaa ctttataaac 1980 cctgatgaac tgtcaatgca atgcattttg atagctttga accggtttct tcaggaaaaa 2040 catggttcca agatggcatt cttggatggt aatcctccgg aaaggctttg tatgccagta 2100 qtqqatcata ttcqatcact aqqtqqqqaa qtqcaactta attctaqqat aaaqaaaatt 2160 gageteaatg acgatggeac ggttaagagt ttettaetea etaatggaag caetgtegaa 2220 ggagacgett atgtgtttge egeteeagte gatateetga ageteetttt accagateee 2280 tqqaaaqaaa taccqtactt caaqaaattq qataaattaq ttqqaqtacc agttattaat 2340 qttcatatat qqtttqatcq aaaactqaag aacacatatg atcacctact ctttagcaga 2400 agtaaccttc tgagcgtgta tgccgacatg tccttaactt gtaaggaata ttacgatcct 2460 aaccggtcaa tgctggagct agtatttgca ccagcagagg aatggatatc acggactgat 2520 totgacatca tagatgcaac aatgaaagaa cttgagaaac tottccctga tgaaatctca 2580 gctgaccaaa gcaaagctaa aattctgaag taccatgtcg ttaagactcc aagatctggg 2640 tacaagacca tcccaaactg tgaaccatgt cgtcctctac aaagatcacc tattgaagga 2700 ttctacttag ctggagatta cacaaaacag aagtacttag cttccatgga aggcgctgtc 2760 ctctctggca aattctgctc tcagtctatt gttcaggatt acgagctact ggctgcgtct 2820 ggaccaagaa agttgtcgga ggcaacagta tcatcatcat gagaaaaaggg cgaattcgtt 2880 aaccgcagac gagctcgtga aatggcctct ttagtttttg attgaatcat aggggtatta 2940 gttttctatg gccgggagtg gtcttcttgc ttaattgtaa tggaataacc agagaggaac 3000 tactgtgtta tctttgagga atgttgggct tttttcgttt gaattatcat gaatgaaatt 3060 ttactttttc ccaatacaag tttgttttcg tttcttggtt tttgttatcc cttggtttat 3120 gtcttggttt ggcttaaatg attgaagatt acactaccta tgtttctgct attcctgttg 3180

aagatcacat ttgataataa tgcatcgaat gcattaaagt ttcttattgg ctctgtcaaa 3240

```
agtattgaag gtggattttt ctaattggca agagaaagta ttaaagaggt gatttattag 3300
tacttatatt tttctcagca tctctctttc agtgttggag cttcataaaa ttagcacttc 3360
agagtttcag tcgggagctg aattcga
<210> 5
<211> 3458
<212> DNA
<213> Arabidopsis thaliana
atgqttqtqt ttqggaatqt ttctqcqqcq aatttgcctt atcaaaacqq qtttttqqaq 60
gcactttcat ctggaggttg tgaactaatg ggacatagct ttagggttcc cacttctcaa 120
gegettaaga caagaacaag gaggaggagt actgetggte etttgcaggt agtttgtgtg 180
gatattccaa ggccagagct agagaacact gtcaatttct tggaagctgc tagtttatct 240
gcatcettcc gtagtgctcc tcgtcctgct aagcetttga aagttgtaat tgctggtgct 300
ggattggctg gattgtcaac tgcaaagtac ctggctgatg caggccacaa acctctgttg 360
cttgaagcaa gagatgttct tggtggaaag atagctgcat ggaaggatga agatggggac 420
tggtatgaga ctggtttaca tattttcttc ggtgcttatc cgaatgtgca gaatttattt 480
ggagaacttg ggatcaatga tcggttgcag tggaaggaac actccatgat ttttgctatg 540
ccaaqtaaac ctggagaatt tagtagattt gacttcccag atgtcctacc agcaccctta 600
aatggtattt gggctatttt gcggaacaac gagatgctga catggccaga gaaaataaag 660
tttgctattg gacttttgcc agccatggtc ggcggtcagg cttatgttga ggcccaagat 720
ggtttatcag tcaaagaatg gatggaaaag cagggagtac ctgagcgcgt gaccgacgag 780
gtgtttattg ccatgtcaaa ggcgctaaac tttataaacc ctgatgaact gtcaatgcaa 840
tgcattttga tagctttgaa ccggtttctt caggaaaaac atggttccaa gatggcattc 900
ttggatggta atcctccgga aaggctttgt atgccagtag tggatcatat tcgatcacta 960
ggtggggaag tgcaacttaa ttctaggata aagaaaattg agctcaatga cgatggcacg 1020
gttaagagtt tettaeteae taatggaage aetgtegaag gagaegetta tgtgtttgee 1080
gctccagtcg atatcctgaa gctcctttta ccagatccct ggaaagaaat accgtacttc 1140
aaqaaattqq ataaattaqt tqqaqtacca gttattaatq ttcatatatq gtttqatcqa 1200
aaactgaaga acacatatga tcacctactc tttagcagaa gtaaccttct gagcgtgtat 1260
qccqacatqt ccttaacttq taaqqaatat tacqatccta accqqtcaat qctqqaqcta 1320
gtatttgcac cagcagatgg ttgtgtttgg gaatgtttct gcggcgaatt tgccttatca 1380
aaacgggttt ttggaggcac tttcatctgg aggttgtgaa ctaatgggac atagctttag 1440
ggttcccact tctcaagcgc ttaagacaag aacaaggagg aggagtactg ctggtccttt 1500
qcaqqtaqtt tqtqtqqata ttccaaqqcc aqaqctaqaq aacactqtca atttcttqqa 1560
agctqctaqt ttatctqcat ccttccqtaq tqctcctcqt cctqctaaqc ctttqaaaqt 1620
tqtaattqct qqtqctqqat tqqctqqatt qtcaactqca aaqtacctqq ctqatqcaqq 1680
ccacaaacct ctqttqcttq aaqcaaqaqa tqttcttqqt qqaaaqataq ctqcatqqaa 1740
qqatqaaqat qqqqactqqt atqagactqg tttacatatt ttcttcggtq cttatccgaa 1800
tgtgcaqaat ttatttggag aacttgggat caatgatcgg ttgcagtgga aggaacactc 1860
catqattttt qctatqccaa gtaaacctgg agaatttagt agatttgact tcccagatgt 1920
cctaccaqca cccttaaatg gtatttgggc tattttgcgg aacaacgaga tgctgacatg 1980
gccagagaaa ataaagtttg ctattggact tttgccagcc atggtcggcg gtcaggctta 2040
tgttgaggcc caagatggtt tatcagtcaa agaatggatg gaaaagcagg gagtacctga 2100
gcgcgtgacc gacgaggtgt ttattgccat gtcaaaggcg ctaaacttta taaaccctga 2160
tgaactgtca atgcaatgca ttttgatagc ttttgaaccgg tttcttcagg aaaaacatgg 2220
ttccaagatg gcattcttgg atggtaatcc tccggaaagg ctttgtatgc cagtagtgga 2280
tcatattcga tcactaggtg gggaagtgca acttaattct aggataaaga aaattgagct 2340
caatgacgat ggcacggtta agagtttett acteactaat ggaagcactg tegaaggaga 2400
cgcttatgtg tttgccgctc cagtcgatat cctgaagctc cttttaccag atccctggaa 2460
agaaataccg tacttcaaga aattggataa attagttgga gtaccagtta ttaatgttca 2520
tatatggttt gatcgaaaac tgaagaacac atatgatcac ctactcttta gcagaagtaa 2580
ccttctgagc gtgtatgccg acatgtcctt aacttgtaag gaatattacg atcctaaccg 2640
gtcaatgctg gagctagtat ttgcaccagc agaggaatgg atatcacgga ctgattctga 2700
catcatagat gcaacaatga aagaacttga gaaactcttc cctgatgaaa tctcagctga 2760
```

	gctaaaattc					
gaccatccca	aactgtgaac	catgtcgtcc	tctacaaaga	tcacctattg	aaggattcta	2880
cttagctgga	gattacacaa	aacagaagta	cttagcttcc	atggaaggcg	ctgtcctctc	2940
tggcaaattc	tgctctcagt	ctattgttca	ggattacgag	ctactggctg	cgtctggacc	3000
aagaaagttg	tcggaggcaa	cagtatcatc	atcatgagaa	aagggcgaat	tcgttaaccg	3060
cagacaggaa	tggatatcac	ggactgattc	tgacatcata	gatgcaacaa	tgaaagaact	3120
tgagaaactc	ttccctgatg	aaatctcagc	tgaccaaagc	aaagctaaaa	ttctgaagta	3180
ccatgtcgtt	aagactccaa	gatctgggta	caagaccatc	ccaaactgtg	aaccatgtcg	3240
tcctctacaa	agatcaccta	ttgaaggatt	ctacttagct	ggagattaca	caaaacagaa	3300
	tccatggaag					
tcaggattac	gagctactgg	ctgcgtctgg	accaagaaag	ttgtcggagg	caacagtatc	3420
atcatcatga	gaaaagggcg	aattcgttaa	ccgcagac			3458